

SPECIFICATION.

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TITLE OF INVENTION: MULTI KNIFE CUTTING DEVICE

Muti knife cutting device, Inclined cutting action..

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REFERENCE: This non-provisional application corresponds to  
provisional application number 60/ 300,605, dated June 25<sup>th</sup> 2001.

## CROSS REFERENCE TO RELATED APPLICATIONS

However I would like to mention that my application no.98/MAS/2001 dated 5<sup>th</sup> Feb 2001 is pending with the Patent office, Chennai, for the same invention. Several improvements and  
5 modifications, which are a result of testing the prototypes after Feb 1<sup>st</sup> 2001, have been included in the US application.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

Not Applicable

## 10 REFERENCE TO A MICRO FICHE APPENDIX

Not applicable

## BACKGROUND OF THE INVENTION

The invention described in this application belongs to the field of kitchen gadgets for cutting  
vegetables which are labor saving. The subject matter of the invention falls under the U.S. patent  
15 classification "083 – CUTTING".

I am listing below some US patents which I came across during a search in the database.

The devices, which I have invented, have no similarities with these.

<u>US Patent no.</u>	<u>Title</u>
6,148,704	Vegetable cutting device
20 6,052,910	Vegetable cutting device
5,950,515	Apparatus for slicing vegetables

There are some more patented multi knife devices, a list of which is enclosed.

The components used are knives, levers, , fasteners, , wooden board, plastic parts etc, which are items in common use. They have been designed and assembled in a novel way to obtain a new  
25 and improved device for cutting vegetables.

The prior art is cutting vegetables with 1) a utility knife 2) Crank operated rotary cutter 3) a vertical knife fixed to a 50x 100x 500 mm wooden base, in addition to the multi knife devices.

The problems in cutting vegetables with a standard utility knife are well known and are listed below.

- 30 - Skill development to ensure cutting is done without hurting the finger.  
- Pressure related strain on the hand.  
- Slow and tedious work which is repetitive  
- Knife touching the board causing scratches  
- Problem of excessive effort in cutting hard vegetables

- Danger of knife slipping
- Cutting finger chips is laborious
- Both hands are to be used, one for holding, one for cutting
- Reluctance to do the job as it is tedious work.
- 5 - Getting uniform size is difficult
- Damage to knife handle due to constant pressure.

Problems in the prior art of multi knife devices.

Buckling of knives,

Vegetables remaining stuck between the knives,

10 Sliding of vegetables,

Knife frames increasing the load arm and reducing the lever advantage.

This invention should not be compared with food processors as they are motorized and the type of cutting is not comparable.

The Rotary type manual devices for vegetable cutting are also not comparable as sheet metal  
15 slits are used for cutting and they cannot be compared to knives for cutting quality.

I was motivated to invent a more productive mechanism after seeing the drudgery inherent in cutting vegetables especially if one happens to be a vegetarian.

BRIEF SUMMARY

The invention “ Multi knife cutting device, Inclined cutting action ” comprises a multi knife  
20 assembly, a base cum guide and a means of connection between them. Lever action is made use of to reduce cutting effort.

The object of the invention is to provide a trouble free multi knife vegetable cutting device which is time and labor saving. The novel design features which separate it from prior art are detailed in the section “ Detailed description of the Multi knife cutting device “.

25 One embodiment will be described in the following pages.

The title of the embodiment is “Multi knife cutting device, Inclined cutting action.”

The advantages of the new invention are: -

- \* The increase in productivity
- The time saving
- 30 • Increased safety
- No fear of cutting fingers
- Even unskilled persons can do the job after a few minutes training
- Uniformity in size
- Use of lever action to gain mechanical advantage

- Elimination of pressure induced injuries on the knife holding fingers
- As the time taken is reduced, it results in cost reduction.

The improvements due to the novel design features in the invention are :

There is no buckling or misalignment of knives due to improved guiding,

5 Sliding of vegetables is prevented,

The cut pieces do not remain stuck between the knives after the cut,

The device is compact and sturdy using proper knives.

BRIEF DESCRIPTION OF DRAWING VIEWS.

Multi knife cutting device – Inclined cutting action.

	<u>Sheet no.</u>	<u>Fig.no.</u>	<u>Details</u>
5	<u>1 / 1</u>	<u>1</u>	<u>Elevation – Inclined cutting action embodiment</u>
	<u>1 / 1</u>	<u>2</u>	<u>End-view of base cum guide,without knives in direction A..</u>

## DETAILED DESCRIPTION OF THE MULTI KNIFE CUTTING DEVICE .

### MULTI KNIFE CUTTING DEVICE. INCLINED CUTTING ACTION.

This is a new vegetable cutting device using multiple knives with several innovative features,

5 making it distinct from any other cutting device. These features will be described at the end of this section.

This is the best mode considering compactness, and versatility in operation.

Fig.no. .1. Elevation view, knives horizontal, dotted lines show knives vertical position.

Fig.no. .2. End view of base cum guide without knives, direction A fig.7. 1.

### 10 PART LIST

Part no.	Name	Quantity	Material.	Dimension in mm
1	Knife	6	SS 420	1x 24x160
2	screw	12	steel	4 dia
15 3	handle	2	Al/laminate	6x24x170
4	fulcrum screw	1	steel	4 dia
5	Vegetable enclosure	1	Al/ laminate	---
6	Guides/	7	Al/laminate	6x129 ht
7	base angle	2	Aluminum	2x20x25
20 8	Spacers	6	laminate	2x20x76
9	Slots for knives	6	--	2 wide
10	screws	2	steel	4 dia
11	End stop	1	wood	

### 25 Construction.

The appearance is shown in fig numbers 1 and 2

Six numbers of knives part 1 are mounted in a base cum guide made up of part 6 guides, part 7 base angle, spacers part 8, and part 10 screws to join them together into a. base cum guide.

30 The knives are joined to the base cum guide by a 4mm screw at location marked 4. The screw acts as a Fulcrum for the movement of the knives. The slot in which the knife is mounted is 2mm wide and the knife is 1 mm thick. The 1 mm gap is filled up by a 1mm thick and 24mm dia laminate washers, 6 numbers, on the fulcrum screw. This makes the knives move without play and function better. The outer 4 knives are assembled into one handle ,part3,170 mm long and the center 2 knives are assembled into another handle. These two groups of knives can be  
35 operated together or separately .

The guides part 6 form an enclosure of 60 x 60 mm ,the bottom surface of which is the support platform for the vegetables.

Functional description.

The device is placed on a flat surface as shown if fig .1.

- 5 The 6 knives are taken back by about 45 degrees from the vertical position forming a gap between the knives and the platform. The vegetables are placed on the platform. The knives are moved clockwise by hand pressing at the extreme end of the two handles to gain maximum lever advantage. The stroke comes to an end in the horizontal position after slicing through the vegetables touching the end stop part 11.
- 10 The cut pieces are lying free on the platform and can be removed by pushing with a wooden piece or by tilting the whole device to the right.

Now the device is ready for the next cutting operation.

This embodiment is the best mode because of the following.

- 15 • The knives are guided through the full cutting operation by the guides part 6 preventing them from bending so that the cutting is smooth.
- It can cut a full potato of section 60 x 60 mm into slices or fingers as the knives are supported on the sides. For this operation the outer four knives are to be used first for cutting while the center two knives are pressing the potato in the middle. The center knives can be pushed down immediately after the outer knives become horizontal.
- 20 • For light cutting jobs like 6 numbers Okra at a time all the 6 knives can be used simultaneously saving time.

Novel features of this embodiment of the invention which distinguish it from prior art inventions.

- 25 The design features of this embodiment of the invention which are novel are explained below.

- The base cum guide comprising of parts 6,7,8,10,  
The base cum guide is the main structure which supports the knives and vegetables. Part 6 guide is the main component of the structure which supports all other parts. Part 6 is made of 6mm thick composite or ABS plastic or aluminum if weight is not a criteria. As seen from fig  
30 7 the guide part 6 has a rectangle shape with a recess inside for keeping the vegetables, called part 5 vegetable enclosure in the part list .Seven numbers of these 6 mm thick elements are assembled together using angles part 7, spacers part 8 and screws part 10 to make a strong , novel and versatile structure for supporting the knives and vegetables. This type of structure has great strength to support the knives and give them positive guiding in their travel to restrict

bending and misalignment. In the prior art the base structure is made of sheet metal in most cases, which is not strong and does not cover the knives during their travel. It is a novel design to combine seven plate like elements to make a versatile structure for this device.

5 This is also a novel concept where one structure achieves many functions and is at the same time compact , sturdy and easy to manufacture.

The various functions of this assembly, base cum guide are listed below :

- supporting the knives through a fulcrum bolt;
- formation of slots between successive guides to keep the knives in position during their travel from beginning to end ;
- 10 • preventing the knives from bending and misalignment as the guides are always in contact with the knives beyond the vegetable enclosure, as the guides guide the knives from beginning to the end of their travel ;
- formation of the vegetable enclosure within the guides very next to the vertical starting position of the knives, reducing the load arm of the lever and increases mechanical
- 15 advantage.

By covering the knives beyond the vegetable enclosure, the guides are effectively reducing the knife length subjected to bending loads. This reduces knife bending to a large extent as the deflection is proportional to the third power of the length.

- Vegetable enclosure part 5, fig 1.

20 As seen in fig 1 the vegetable enclosure is formed within the base cum guide assembly. The reduction in the load arm due to its location is explained in the section on base cum guide .

The enclosure stops the vegetables from sliding as they are supported by the vertical wall of the enclosure. This is a solid support. In the prior art the supports are not present or not of sufficient size to stop sliding.

25 As the enclosure is covered on four sides, the vegetables become self supporting. There is no need to hold them during cutting.

- Slots below the vegetable enclosure.

The guides part 6 form the slots even below the vegetable enclosure 5. The knives enter the respective slots after cutting through the vegetables and come to a stop when the handles touch part 11 end stop. As a result of this design the cut pieces remain on the base of the enclosure completely free from the space between the knives without any extra effort. This is a novel feature. In much of the prior art this feature is not there or it is not of such quality and strength. The end stop stopping the knives ensures that the knife edges are saved from damage.

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- Mounting of knives.

In this invention there is no frame to hold the knives in place before they are mounted on the base. They are mounted directly on the base cum guide using a fulcrum bolt part 4,fig 1. This is a novel feature and increases the lever advantage as the load arm is reduced in direct mounting.

The direct mounting makes the device simple and compact.

It also facilitates the possibility of using 2,4 or 6 knives as the handles are joined in 4 plus 2 fashion. This is of help when cutting hard and large vegetables.

The absence of knife frame increases access to the device and also eliminates the fouling of large vegetables with the knife frame.

All the above features make the device compact, sturdy ,easy to use and very effective in making smooth cuts with multiple knives.

In addition to dicing of vegetables, this device is capable of making French fries from whole potatoes without changing any knives. This is a feature which is distinguishing from prior art.

#### OTHER DESIGN VARIATIONS WITH THE SAME PRINCIPLE

The description of the embodiment in the preceding pages is considered as an illustration of the design principles of the invention and is not an exhaustive collection of all the variations.

The invention is not limited to the embodiments described in this application. All feasible modifications and variations within the scope of the invention may be resorted to in due course.